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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/581,411	08/07/2006	Timothy Ramford Vittor	P/382-156	3753

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EXAMINER	
CHANG, LI WU	

ART UNIT	PAPER NUMBER
2129	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/581,411	VITTOR ET AL.	
	Examiner	Art Unit	
	LIWU CHANG	2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 June 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 June 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☒ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/01/2006*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. Claims 4-5, 9-10, 12-14, 16-17, 18, 20-21, 23, 26, 29, 31, 36, 39, 40 and 42 are amended. Claim 44 is new. Claims 1-44 are pending.

Information Disclosure Statement

The information disclosure statement filed on 06/01/2006 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because information about the date and class and subclass is missing. It has been placed in the application file, but the information referred to therein has not been considered as to the merits.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims **1, 18-23, 26, 32-33, 36-43** are rejected under 35 U.S.C. 102(e) as being anticipated by **Ozawa** et al. (US Patent No. 5,055,755), hereinafter Ozawa.

3. With respect to claim 1, Ozawa discloses a method for controlling a system formed from a plurality of interdependent units to achieve an outcome, comprising the steps of establishing a desired outcome for the system, and establishing a desired

action for each unit responsive to the outcome but independently of the desired action of the other units (**Ozawa**: in Fig 1, the manipulator is an example of a system of interdependent units, in Fig 17, the locus of motion, as of steps P1, … P21, imply the desired action, and in Fig 9, functions in the modules, such as “motor control program”, “motor fault countermeasure program” and “drive degree change program” describe each unit responsive to the outcome and independent action).

4. With respect to claim 18, Ozawa discloses wherein the outcome is dependent on a spatial relationship of the system (**Ozawa**: Figs 18-21, “data of points”, ‘locus of motion” imply spatial relationship).

5. With respect to claim 19, Ozawa discloses wherein the outcome is a predetermined spatial relationship of the system relative to a desired location (**Ozawa**: C 8, L 55-60, “locus of motion” imply an action of following the path which can be predetermined).

6. With respect to claim 20, Ozawa discloses wherein the outcome is also time dependent (**Ozawa**: Fig 14 shows the computation that is time dependent).

7. With respect to claim 21, Ozawa discloses wherein the desired action involves adjusting the spatial position of that unit (**Ozawa**: C 2, L 49-51, “changing the control drive degree …” imply adjusting the spatial position).

8. With respect to claim 22, Ozawa discloses wherein the adjustment is by way of movement of the unit and/or expansion or contraction of that unit (**Ozawa**: C 8, L 1-5, drive speed and direction imply the movement).

9. With respect to claim 23, Ozawa discloses wherein the outcome determines the desired position (**Ozawa**: Fig 16, “current position” implies outcome determining positions).

10. With respect to claim 26, Ozawa discloses a system for controlling a plurality of interdependent units moveable to achieve an outcome, the system comprising a controller arranged to implement a control methodology in accordance with Claim I (**Ozawa**: Figs 9-23 imply control methodologies).

11. With respect to claim 32, Ozawa discloses a computer program arranged to, when loaded on a computing system, perform the method of Claim 1 (**Ozawa**: C 1, L 25-30, describe such a program).

12. With respect to claim 32, Ozawa discloses a computer readable medium incorporating a computer program in accordance with Claim 32 (**Ozawa**: Fig 1 shows different controllers and thus, implies the deployment of programs).

13. With respect to claim 36, Ozawa discloses a system comprising a plurality of units, the units being interdependent and being capable of movement relative to one another, at least one actuator operative to move the units, and a control system operative to impart instructions to the at least one actuator to move the units, wherein the controller uses a control methodology in accordance Claim 1 (**Ozawa**: Fig 1, a robot system implies being capable of movement, the controller and CPU impart instructions to each actuator, as shown in Fig 2, according to control methodology as described in Figs 9-23).

14. With respect to claim 37, Ozawa discloses wherein the units are interdependent by being in a predetermined spatial relationship (**Ozawa**: C 8, L 54-60, describe locus which can be predetermined).

15. With respect to claim 39, Ozawa discloses wherein the control system comprises a plurality of controllers located in respective ones of the units, each controller being operative to impart instructions to the at least one actuator to move the unit to which it is associated, wherein the controllers use a control methodology in accordance with Claim 1 (**Ozawa**: Fig 1 shows different types of controllers operative to instructions).

16. With respect to claim 40, Ozawa discloses wherein each unit is a constituent part of a robot (**Ozawa**: Fig 1 shows a robot system).

17. With respect to claim 41, Ozawa discloses wherein each constituent part is a module in a robotic manipulator (**Ozawa**: Fig 1, wherein at least a segment with motor controller can be an example of a module).

18. With respect to claim 42, Ozawa discloses a system comprising a plurality of subsystems, each subsystem comprising a plurality of units, the units being interdependent and being capable of movement relative to one another (**Ozawa**; Fig 1 shows the interdependent units); at least one actuator operative to move the units in each subsystem (**Ozawa**: Figs 1-2 show actuation); and a control system operative to impart instructions to the at least one actuator using a control methodology in accordance with Claim 1 (**Ozawa**: Fig 9 the execution of a program implies the control t impart instructions to some actuators).

19. With respect to claim43, Ozawa wherein to achieve a desired outcome, intermediate outcomes are established for each of the subsystems, and wherein the control system coordinates movement of the subsystems by coordinating the intermediate outcomes for each subsystem (**Ozawa**: Fig 18, “receive data”, “find out joint angles between respective points”, Fig 20, “receive feedback data”, Fig 21, “fault” and “locus”, Fig 22, “locus calculation” and “lock angle”, and Fig 23, “transmit data through another controller” imply coordinating the intermediate outcomes for each subsystem).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

20. Claims 2-13, 24-25, 27-31, 34-35 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ozawa**, in view of **Seraji** (US Patent No. 5414799), and hereinafter Seraji.

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21. With respect to claim 2, Ozawa discloses wherein the desired action for a said unit is established in response to the current position of at least one reference portion of the system relative to a desired position of that reference portion (**Ozawa**: C 7, L 60-67 and C 8, L 1-5, “drive degree, drive speed and rive direction” imply desired action, and “the CPU 46 finds a deviation between the target position data and the angular a position data of the servomotor” imply the current position and the desired position).

Ozawa fails to particularly call for the term “reference portion” in the limitation. Seraji discloses “reference portion” (**Seraji**: Abstract, L 18-22, the “frame of reference” and Figs 6-7, the reference coordinates are examples of reference portion).

It would have been obvious for one of ordinary skill in the art at the time of invention to incorporate the reference frames, as disclosed by Seraji, into the parametric

representation of Ozawa, because the reference frame is necessary to the control computation of a robotic system.

22. With respect to claim 3, Ozawa discloses a method for controlling a system formed from a plurality of interdependent units to achieve an outcome, comprising the steps of establishing a desired outcome for the system, and establishing a desired action for each unit responsive to the outcome, wherein the desired action for a said unit is established in response to the current position of at least one reference portion of the system relative to a desired position of that reference portion (**Ozawa**: Fig 1, the manipulator is an example of a system of interdependent units, Fig 17, the motion locus, P1, … P21 imply the desired action, and Fig 9, functions given in modules, such as “motor control program”, “motor fault countermeasure program” and “drive degree change program” describe each unit responsive to the outcome and independent action, where C 7, L 60-67 and C 8, L 1-5, “drive degree, drive speed and rive direction” imply desired action, and “a deviation between the target position data and the angular a position data of the servomotor” imply the current position and the desired position).

Ozawa fails to particularly call for the term “reference portion” in the limitation. Seraji discloses “reference portion” (**Seraji**: Abstract, L 18-22, the “frame of reference” and Figs 6-7, the reference coordinates are examples of reference portion).

It would have been obvious for one of ordinary skill in the art at the time of invention to incorporate the reference frames, as disclosed by Seraji, into the parametric representation of Ozawa, because the reference frame is necessary to the control

computation of a robotic system.

23. With respect to claim 4, Ozawa discloses wherein the desired action for a said unit involves calculating a difference value between the current position of a said reference portion and the desired position of that reference portion, and using said difference value to establish said desired action (**Ozawa**: C 7, 60-67, “deviation” implies the difference, and C 8, L 1-10, “the CPU 46 produces drive control signal representative of drive degree, drive speed and drive direction” imply using said difference value to establish said desired action where C 8, L 10-25 describe the control). Seraji discloses the reference portion (**Seraji**: Abstract, L 18-22).

24. With respect to claim 5, Ozawa discloses the steps of establishing an operation action for each unit (**Ozawa**: C 7, 60-67 and C 8, L 1-10 describe the steps of establishing operation actions); and instructing each unit to initiate its operation action (**Seraji**: C 11, EQ 114 – EQ 120 show the initiation values).

25. With respect to claim 6, Ozawa discloses the step of iterating the method steps to update the operation action (**Seraji**: C 11, EQ 114 – EQ 120).

26. With respect to claim 7, Ozawa discloses wherein the rate of iteration is constant throughout the system (**Ozawa**: Fig 15 shows the rate control which includes a constant rate).

27. With respect to claim 8, Ozawa discloses wherein the rate of iteration varies between units of the system (**Ozawa**: C 3, L 10-15, "… to detect the controller having the lowest operation rate in the next operation cycle" imply the various rate between units).

28. With respect to claim 9, Ozawa discloses wherein the operation action for at least some of the units is the desired action (**Ozawa**: L 3, L 1-10, "controller" is one of the units).

29. With respect to claim 10, Seraji discloses the steps of establishing constraint factors for the system, and establishing a constrained action for at least one unit responsive to the constraint factors (**Seraji**: Fig 7, shows the constraint and C 11, EQ 114-120 show the solution with respect to constraints).

30. With respect to claim 11, Ozawa discloses wherein the operation action for a unit for which a constrained action has been established is the constrained action (**Ozawa**: Fig 17, following the path trajectory is an example of constrained action).

31. With respect to claim 12, Ozawa discloses wherein only the constraint factors for a unit are utilized in establishing the constrained action for that unit (Ozawa: C 7, L 60-

67 and C 8, L 1-20 describe the constrain factor for each unit, where an exemplary constraint is the path planning, as in Fig 17).

32. With respect to claim 13, Ozawa discloses wherein constraint factors relating to at least one unit are utilized in establishing a said constrained action for another said unit (**Ozawa**: the unit 18 is an example of the unit and/or CPU 46).

33. With respect to claim 24, Ozawa discloses a method for controlling a plurality of interdependent units, comprising the steps of, for each unit, independently deriving an operation action (**Ozawa**: C7, L 60-67 and C 8, L 1-10 describe steps of deriving actions).

Ozawa fails to particularly call for the term “starting information” in the limitation. Seraji discloses “starting information” (**Seraji**: C 11, EQ 114-120 show starting information).

It would have been obvious for one of ordinary skill in the art at the time of invention to incorporate the starting information, as disclosed by Seraji, into the parametric representation of the control system Ozawa, because staring information is necessary in the control.

34. With respect to claim, Seraji discloses wherein the starting information is selected from the group comprising a desired outcome, a desired action, a constraint action and a reference position (**Seraji**: C 11, EQ 114-120 and Fig 6 shows desired

actions, constraints a reference position and coordinates).

35. With respect to claim 27, Ozawa discloses wherein the information regarding the presence of constraining factors is collected by a sensor (**Ozawa**: Figure 1, unit 19 is an example of a sensor).

36. With respect to claim 28, Ozawa discloses wherein the movement is performed by an actuating means (**Ozawa**: Fig 1, functions of “motor controller” imply an actuating means).

37. With respect to claim 29, Ozawa discloses wherein each interdependent unit is a constituent part of a robot (**Ozawa**: Fig 1 shows constituent parts).

38. With respect to claim 30, Ozawa discloses wherein each constituent part is a module in a robotic manipulator (**Ozawa**: Fig 9 shows control modules for each constituent part).

39. With respect to claim31, Ozawa discloses control means capable of switching the control methodology of the system to a centralised control methodology (**Ozawa**, C 7, L 7-13, “CPU 54 of the hand motor controller” carries out centralized control methodology).

40. With respect to claim 34, Ozawa discloses a computer program arranged to, when loaded on a computing system, perform the method of Claim 3 (**Ozawa**, Fig 9, block 9, implies a program t perform the method).

41. With respect to claim 35, Ozawa discloses a computer readable medium incorporating a computer program in accordance with Claim 34 (**Ozawa**: Fig 9 implies the execution according to stored program).

42. With respect to claim 44, Ozawa discloses wherein the desired action for a said unit involves calculating a difference value between the current position of a said reference portion and the desired position of that reference portion, and using said difference value to establish said desired action (**Ozawa**: C 7, L 60-67 and C 8, L 1-5, “drive degree, drive speed and rive direction” imply desired action, and “the CPU 46 finds a deviation between the target position data and the angular a position data of the servomotor” imply the current position and the desired position). Seraji discloses reference portion (**Seraji**: Abstract, L 18-22, the “frame of reference” and Figs 6-7, the reference coordinates are examples of reference portion).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LIWU CHANG whose telephone number is 571-270-3809. The examiner can normally be reached on 8:30AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Vincent can be reached on 571-272-3080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. C./ September 20, 2008
Examiner, Art Unit 2129

/David R Vincent/

Supervisory Patent Examiner, Art Unit 2129